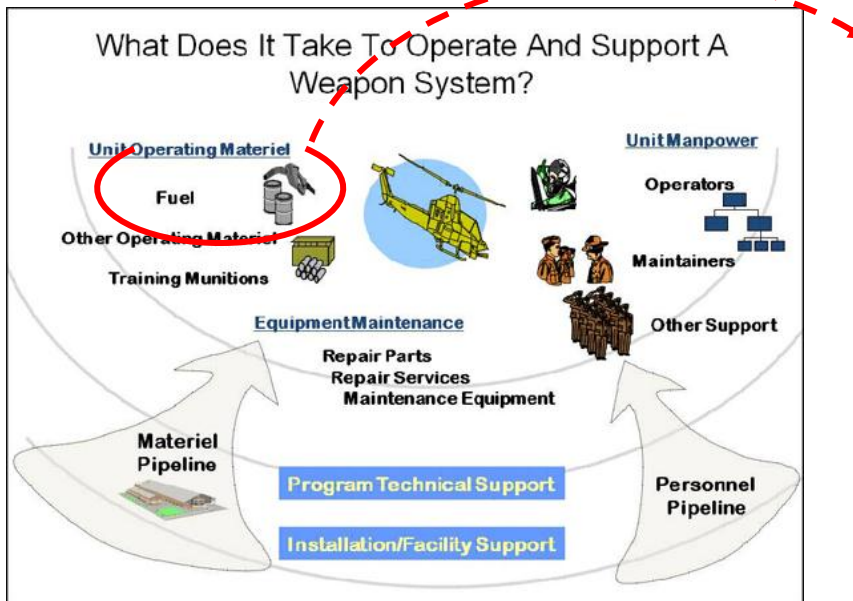




Fully Burdened Cost of Energy (FBCE) Overview

- ❑ Background
- ❑ FBCE: Delivery to Ground Forces
- ❑ FBCE Characteristics
- ❑ Summary

From the abstract...



...to the reality





FBCE Background

- ❑ **DSB 2008 Task Force recommendations on DoD operational energy: “More Fight – Less Fuel”**
- ❑ **NDAA 2009 (§332): SecDef *must consider* FBCE in *planning, capability requirements development and acquisition processes***
- ❑ **ASN(RDA) Stackley memo (June 2011)**
 - Ties FBCE to scenarios, not LCC
 - Tasks Navy Commands to develop their FBCE methodologies by Oct 2011
- ❑ **Required in DoDI 5000.02, CJCSI 3170 in the Availability KPP, ownership cost KSA**
- ❑ **Defense Acquisition Guidebook - FBCE methodological framework**
 - <https://acc.dau.mil/CommunityBrowser.aspx?id=314767#3.1.6>

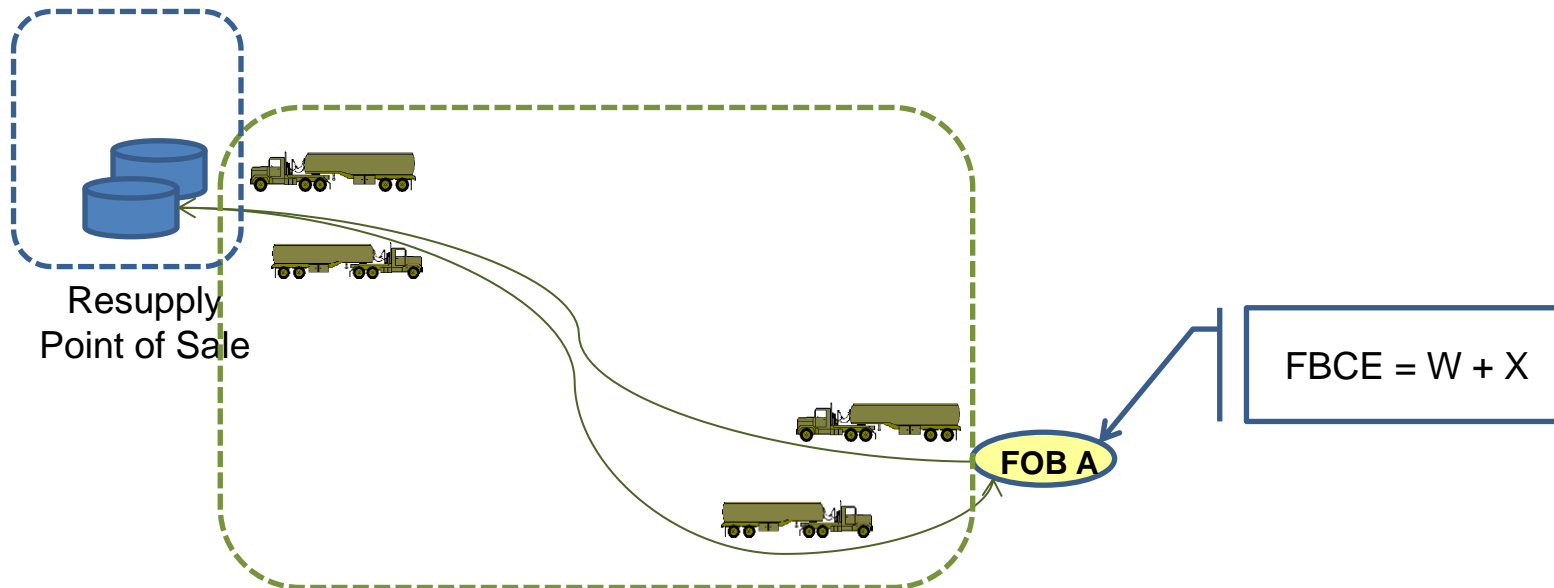


FBCE: Delivery to Ground Forces

Simplified Notional Scenario

Not to Scale

- ❑ FOB A demands **G** gallons per day
- ❑ Cost per gallon delivered to FOB A = cost at point of sale (W \$/gal) + cost of trucking it via HET to FOB A (X \$/gal)
 $= W + X$



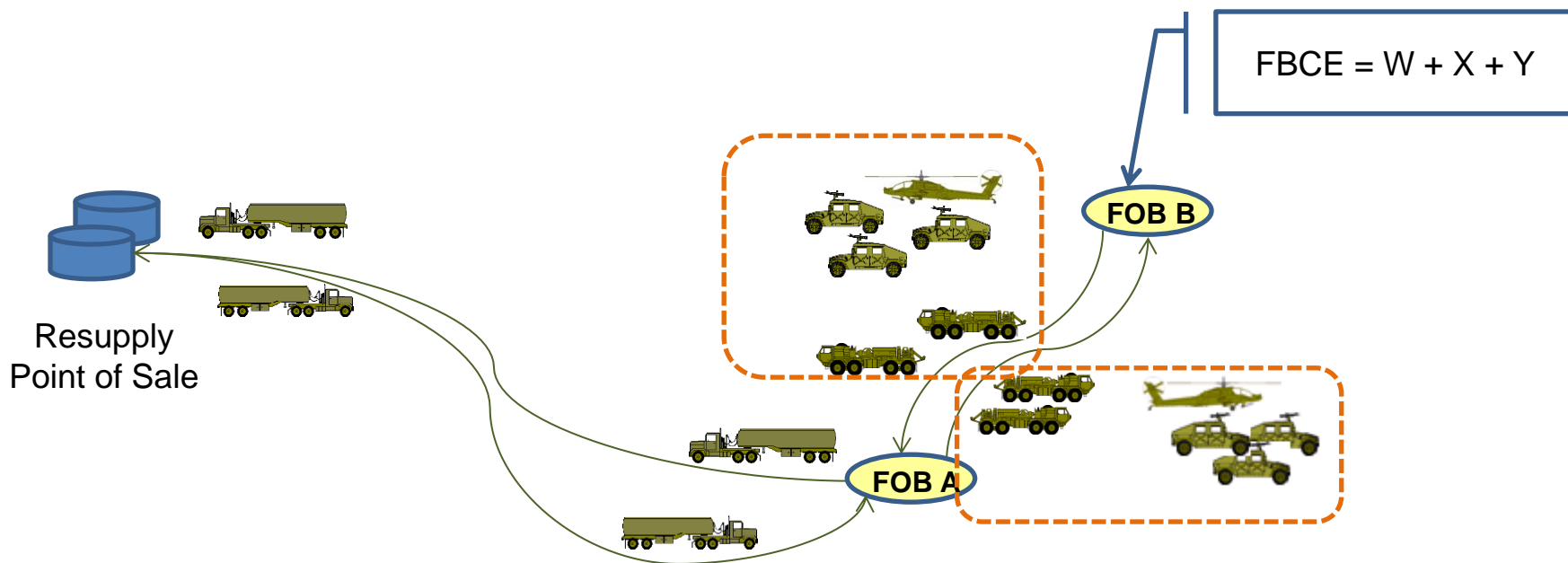


FBCE: Delivery to Ground Forces

Simplified Notional Scenario

Not to Scale

- ❑ FOB B demands **H** gallons per day
- ❑ Cost per gallon delivered to FOB B = **W** + **X** + [cost of trucking it to FOB B in HEMTTs (for terrain) + cost of security forces (for threat)]
= **W** + **X** + **Y**



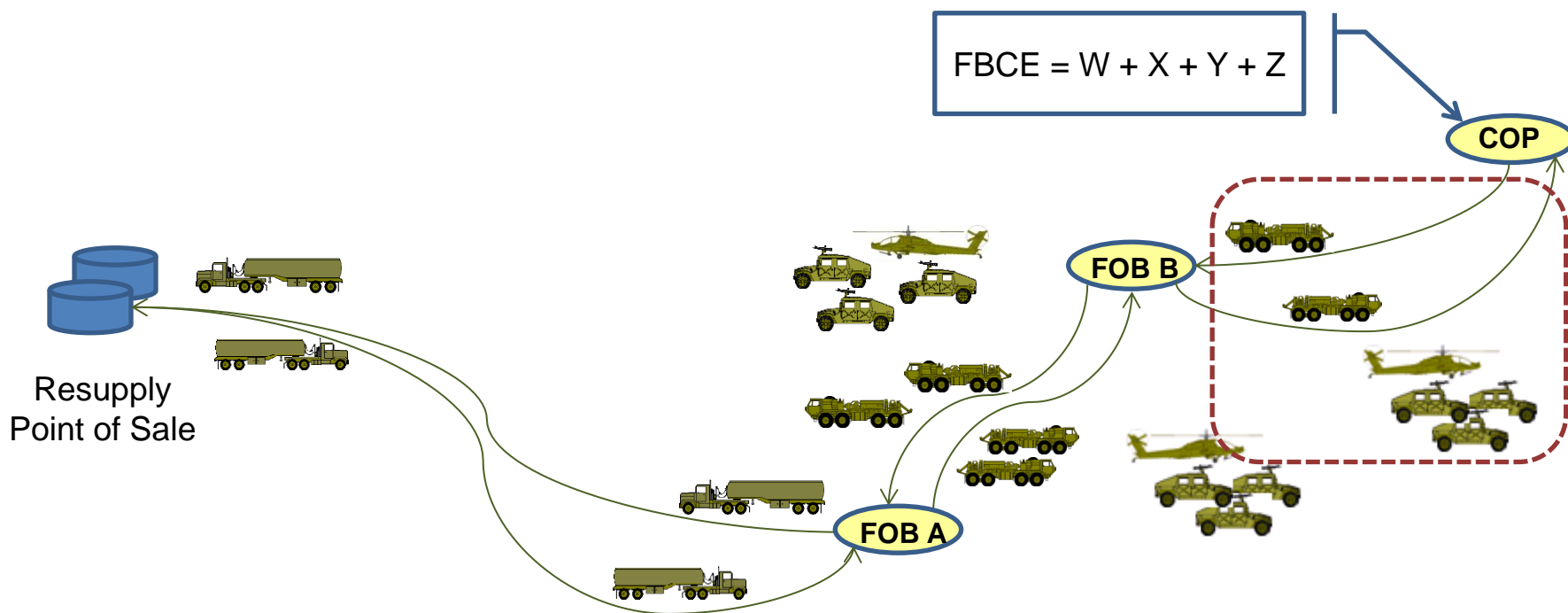


FBCE: Delivery to Ground Forces

Simplified Notional Scenario

Not to Scale

- ❑ Combat Out Post (COP) demands **I** gallons per day
- ❑ Cost per gallon delivered to COP = **W** + **X** + **Y** + cost of trucking it via HEMTT + cost of security forces = **W** + **X** + **Y** + **Z**



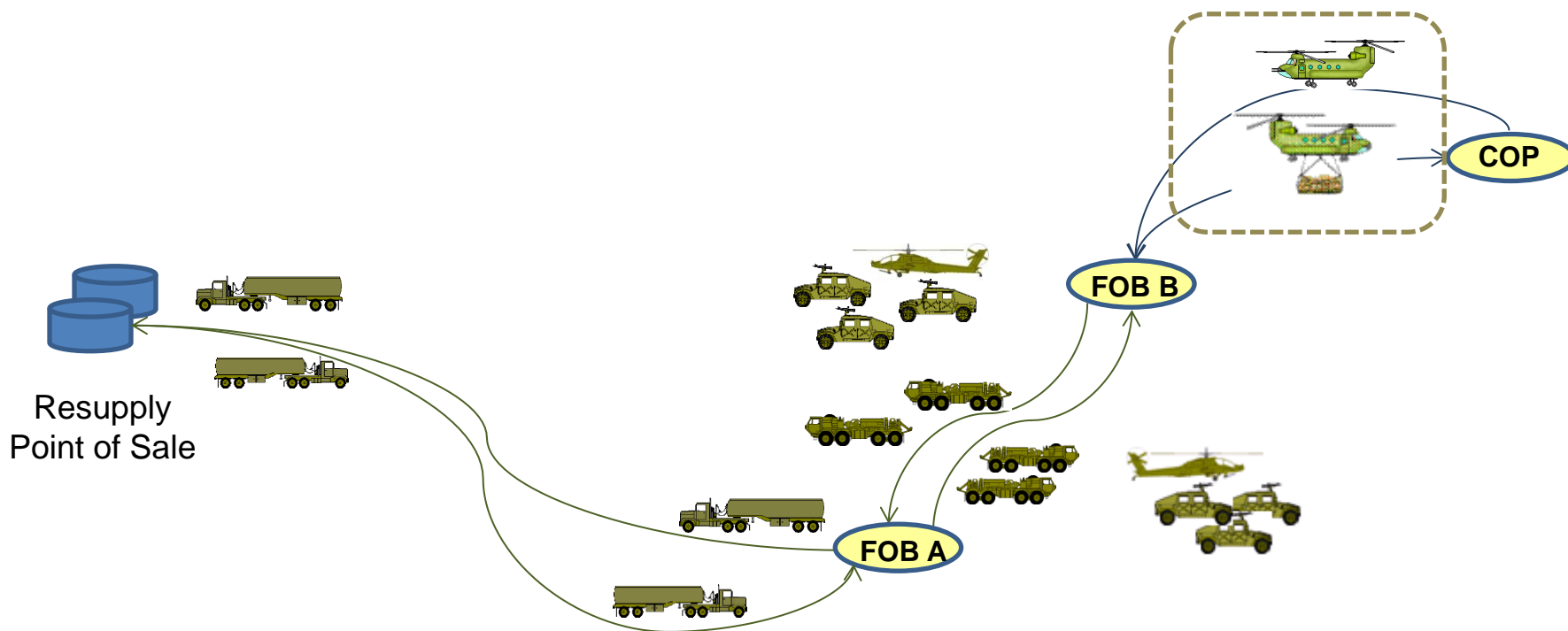


FBCE: Delivery to Ground Forces

Simplified Notional Scenario

Not to Scale

Cost per gallon delivered to COP = $W + X + Y$ + cost of airlifting it via sling load under CH-47s = $W + X + Y + Z1$



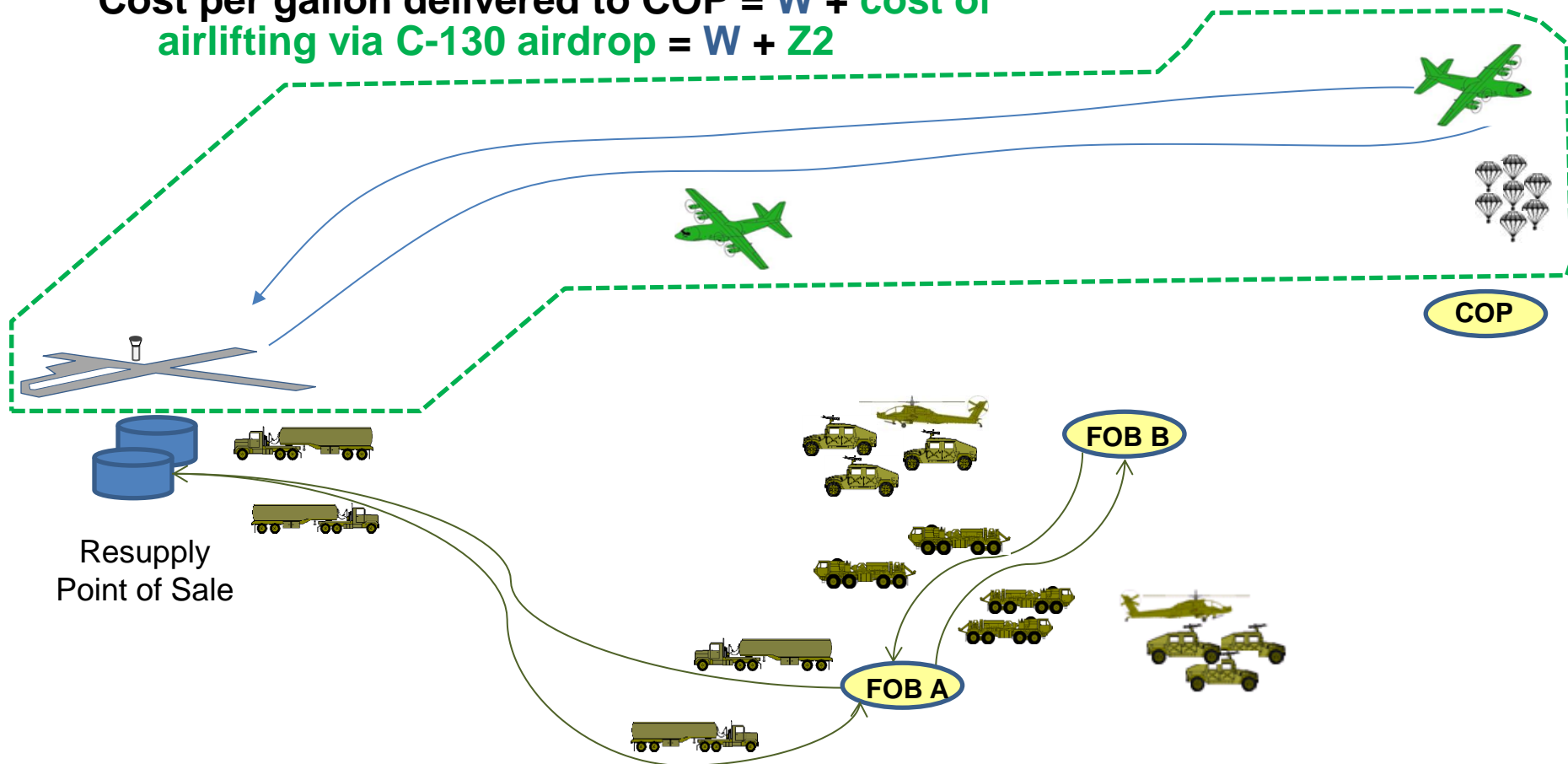


FBCE: Delivery to Ground Forces

Simplified Notional Scenario

Not to Scale

Cost per gallon delivered to COP = W + cost of
airlifting via C-130 airdrop = W + $Z2$



FBCE depends on where the “user” is located in the network, and what modes of transport are used to supply that user



FBCE Price Elements

Element #	Price Element	Burden Description
1	Fuel Commodity Price	DLA Energy capitalized cost to purchase, transport, store, and manage fuel to the Point of Sale at the edge of the scenario battlespace.
2	Tactical Delivery Assets Burden*	Includes all of the following:
	Fuel Delivery O&S Price	Per gallon price of operating service-owned fuel delivery assets including the cost of military and civilian personnel dedicated to the fuel mission.
	Depreciation Price of Fuel Delivery Assets	Measures the decline in value of fuel delivery assets with finite service lives using straight-line depreciation over total service life.
	Infrastructure, environmental, and other miscellaneous costs over/above and distinct from the DLA Energy capitalized cost of fuel	Per gallon price of fuel infrastructure, regulatory compliance, tactical terminal operations, and other expenses as appropriate.
3	Security/Force Protection Assets Burden*	Per gallon price associated with delivering fuel, such as route clearance, convoy escort and force protection. Includes the manpower, O&S, and asset depreciation costs of the force protection.

* These prices vary by Service, delivery method (ground, sea, air) and delivery location.



Characteristics of FBCE

- ❑ **FBCE calculation is highly scenario-specific**
 - Unlike Total Ownership Cost, FBCE needs combat employment context, and must encompass the employment of fuel delivery and security assets
- ❑ **Depends on where the “user” is located in the logistics network**
 - In the previous example, FBCE (FOB A) \neq FBCE (FOB B) \neq FBCE (COP)
- ❑ **Depends on what modes of transport are used to supply that user, with what frequency, over what period of time**
 - A monthly average FBCE may include all three modes: 80% ground (X+Y+Z) + 15% ground and helo (X+Y+Z1) + 5% airdrop (Z2)
 - Cost of supplying a point on the network depends on the frequency of deliveries
- ❑ **Point-of-Sale cost (W) is not informative**
 - Fixed by DLA Energy, an average world-wide
 - Not specific to the point of sale of interest in the scenario
- ❑ **Depreciation is a function of the age of the particular transport/security asset; should be ignored**
 - Can be highly variable in the field (35 year-old tanker vs brand new KC-46)



Characteristics of FBCE

- ❑ **FBCE allows a logistic system's energy throughput and risks to be framed in same context as other system attributes and risks**
 - Cost comparison between delivery modes (e.g., $(X+Y+Z)$ vs $(X+Y+Z1)$ vs $Z2$)
 - Expected Value (risk-and-cost) comparison between delivery modes
 - Expected Value Lost on path XYZ = $\text{Prob} [\text{loss}]_{\text{pathXYZ}} \times \text{FBCE}_{\text{pathXYZ}}$
 - Compare to Expected Value Lost on path XYZ1 and Expected Value Lost on path Z2
- ❑ **Informs investment decisions that may help reduce demand**
 - Example: Break even point (gal/day) for a costly but energy efficient device that reduces demand at COP (Can the up front investment be offset by FBCE no longer required at COP?)



FBCE Summary

- ❑ FBCE is specific to a scenario-, a location, a string of transport modes, and a time frame**
- ❑ FBCE characterizes the total logistics throughput effort all the way to the end of the “last tactical mile”**
- ❑ Brings an additional perspective to “cost” within “cost, schedule, performance” trade space for logistics initiatives that reduce demand**
 - The higher cost of deploying more efficient end users may be offset by the FBCE savings in reduced frequency of fuel deliveries
 - Example: Deploying a hybrid solar/generator/water purification unit to the “tactical edges” where FBCE is high may be justified by calculating FBCE at those locations